Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL QUALITY MEASURES CLEARINGHOUSE

General

Title

Urinary tract infection admission: percentage of admissions with a principal diagnosis of urinary tract infection per 100,000 population, ages 18 years and older.

Source(s)

AHRQ QI research version 5.0. Prevention quality indicator 12 technical specifications: urinary tract infection admission rate. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 2 p.

National Quality Forum measure information: urinary tract infection admission rate (PQI 12). Washington (DC): National Quality Forum (NQF); 2014 Sep 18. 17 p.

Measure Domain

Primary Measure Domain

Related Population Health Measures: Population Use of Services

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure is used to assess the percentage of admissions with a principal diagnosis of urinary tract infection per 100,000 population, ages 18 years and older.

Rationale

Urinary tract infection (UTI) is a common acute condition that is most commonly treated empirically in the outpatient setting. Interventions to avoid recurrent UTI include antimicrobial prophylaxis, post-coital prophylaxis, and patient-initiated therapy. Patient education and prevention are especially important in patients with diabetes, who are at higher risk of infection, although UTI management and treatment is

essentially the same as in patients without diabetes. Simple interventions to increase the frequency of liquid intake in high-risk and at-home programs serving older populations can help reduce the rate of hospitalizations related to UTI (as well as dehydration).

Uncomplicated UTIs for the most part are treated in the outpatient setting; however, this condition may progress to more clinically significant infections, such as pyelonephritis, in vulnerable individuals with inadequate or delayed treatment. When access to outpatient is not available or delayed, patients are more likely to use the emergency department for their clinic care and are more likely to present later in the disease process, increasing their probability for admission.

This measure is an avoidable hospitalization/ambulatory care sensitive condition (ACSC) type indicator. ACSC type indicators are not measures of hospital quality, but rather measures of potentially avoidable hospitalization if appropriate outpatient care, other healthcare services or community services were accessed and obtained (i.e., measures of the health care system broadly defined). These measures are designed to assess population access to timely, high quality outpatient and public health services in a particular geographic area, for the purpose of managing chronic disease or diagnosing acute illnesses before progressing to inpatient treatment. These measures are of most interest to comprehensive health care delivery systems, such as some health maintenance organizations (HMOs), accountable care organizations (ACOs) or public health agencies. ACSC indicators correlate with each other and they may be used in conjunction as an overall examination of outpatient care and access to care at a national, regional or county level.

Evidence for Rationale

National Quality Forum measure information: urinary tract infection admission rate (PQI 12). Washington (DC): National Quality Forum (NQF); 2014 Sep 18. 17 p.

Primary Health Components

Urinary tract infection (UTI); ambulatory care sensitive condition (ACSC)

Denominator Description

Population ages 18 years and older in metropolitan area or county (see the related "Denominator Inclusions/Exclusions" field)

Numerator Description

Discharges, for patients ages 18 years and older, with a principal International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code for urinary tract infection (see the related "Numerator Inclusions/Exclusions" field)

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

A clinical practice guideline or other peer-reviewed synthesis of the clinical research evidence

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

Although urinary tract infections (UTI) represent the most common bacterial infection encountered in the ambulatory care setting with over 8.6 visits in 2007 (Foxman, 2002; Sammon et al., 2014), it is estimated that ten percent of hospital admissions for UTI could be avoided by improved ambulatory care access. Of the 1.6 billion dollars spent on UTI in 2007, 55% of expenditures were attributed to inpatient care (Sammon et al., 2014). Eighty-four (84%) percent of these visits were women (of which 23.3% originated in the emergency department [ED]) (Hooton, 2012; Schappert & Rechtsteiner, 2011). A more recent population based study, years 2006 to 2009, reported an average 2.7 million ED visits per year leading to 450,136 admissions (Sammon et al., 2014). Significant predictors for hospital admission include increased age (OR=1.037), pyelonephritis (OR=5.29), and male gender (OR=1.58). Admitted patients are also more likely to have Medicare insurance, be cared for at an urban teaching hospital, and or treated at zip codes with higher median incomes (Sammon et al., 2014). These numbers are much higher than the 1997 National Hospital Ambulatory Medical Care Survey, where researchers reported close to 1 million ED visits for UTI that resulted in 100,000 hospitalizations (McCaig, 1997). Increasing ED utilization for primary care and use of the ED as an admission pathway are thought to be responsible for this dramatic increase in ED visits (Sammon et al., 2014). Other reports suggest an increasing rise of hospitalizations for UTI associated with an aging population, increasing levels of associated patient comorbidities (especially the escalating rate of diabetes and obesity), and growing levels of antimicrobial resistance to oral medications used to treat UTI in the community setting (Sammon et al., 2014). The Urologic Diseases in America project reported a sharp increase in ED visits for UTI in younger women; also contributing the upswing to potential disparities in access to health insurance and or primary care providers (Griebling, 2005).

Many state departments of health track Prevention Quality Indicator (PQI) 12. For example, the California Office of Statewide Health Planning & Development reported a 6.5% decrease in age-sex adjusted rates for PQI 12 between 2007 and 2011 (although unadjusted rates were slightly higher) (California Office of Statewide Health Planning & Development, 2013). A study of Maryland Medicare Fee-for-Service (FFS) beneficiaries reported that African Americans had slightly higher adjusted UTI admission rates compared to whites. Although this difference was non-significant, the difference was responsible for 142 avoidable hospitalizations in 2006 resulting in an additional $907,330 U.S. dollars (O'Neil et al., 2010).

Evidence for Additional Information Supporting Need for the Measure

California Office of Statewide Health Planning & Development. AHRQ - Prevention Quality Indicators (PQIs). [internet]. Sacramento (CA): California Office of Statewide Health Planning & Development; [accessed 2013 Oct 03].

Foxman B. Epidemiology of urinary tract infections: incidence, morbidity, and economic costs. Am J Med. 2002 Jul 8;113 Suppl 1A:5S-13S. PubMed

Griebling TL. Urologic diseases in America project: trends in resource use for urinary tract infections in men. J Urol. 2005 Apr;173(4):1288-94. PubMed

Hooton TM. Clinical practice. Uncomplicated urinary tract infection. N Engl J Med. 2012 Mar 15;366(11):1028-37. PubMed

McCaig LF. National Hospital Ambulatory Medical Care Survey: 1996 outpatient department summary. Adv Data. 1997 Dec 17;(294):1-17. PubMed

National Quality Forum measure information: urinary tract infection admission rate (PQI 12). Washington (DC): National Quality Forum (NQF); 2014 Sep 18. 17 p.

O'Neil SS, Lake T, Merrill A, Wilson A, Mann DA, Bartnyska LM. Racial disparities in hospitalizations for ambulatory care-sensitive conditions. Am J Prev Med. 2010 Apr;38(4):381-8. PubMed

Sammon JD, Sharma P, Rahbar H, Roghmann F, Ghani KR, Sukumar S, Karakiewicz PI, Peabody JO, Elder JS, Menon M, Sun M, Trinh QD. Predictors of admission in patients presenting to the emergency department with urinary tract infection. World J Urol. 2014 Jun;32(3):813-9. PubMed

Schappert SM, Rechtsteiner EA. Ambulatory medical care utilization estimates for 2007. Vital Health Stat 13. 2011 Apr;(169):1-38. PubMed

Extent of Measure Testing

Reliability Testing

The developer's metric of reliability is the signal to noise ratio, which is the ratio of the between county (area) variance (signal) to the within county (area) variance (noise). The formula is signal / (signal + noise). There is a county (area)-specific signal to noise ratio, which is used as an empirical Bayes univariate shrinkage estimator. The overall signal to noise ratio is a weighted average of the county (area)-specific signal-to-noise ratio, where the weight is [1 / (signal + noise)^2]. The signal is calculated using an iterative method. The analysis reports the reliability of the risk-adjusted rate (before applying the empirical Bayes univirate shrinkage estimator).

Overall the risk-adjusted rate is highly reliable. Based on a norm of a signal-to-noise ratio of 0.80, 80% of counties (areas) exceed the norm. Reliability is less than the norm in areas with population less than approximately 3,000 persons, meaning that the performance score is reliability adjusted closer to the shrinkage target in those areas.

Validity Testing

The developer conducted construct validity testing to examine the association between the risk-adjusted rate and area structural characteristics potentially associated with quality of care, including prior performance, using regression analysis.

Given the stated rationale, the expectation for the regression analysis given the expected relationship between the "Less Access to High Quality Outpatient Care" construct validity measure (F1) and the county (area) risk-adjusted rate is a positive, statistically significant coefficient. The expectation for the regression analysis given the expected relationship between the "More Market Competition" construct validity measure (F2) and the county (area) risk-adjusted rate is a positive, statistically significant coefficient. The results are consistent with expectations. Also, past performance is a moderate predictor of current performance with a coefficient of 0.78.

Refer to the original measure documentation for additional measure testing information.

Evidence for Extent of Measure Testing

National Quality Forum measure information: urinary tract infection admission rate (PQI 12). Washington (DC): National Quality Forum (NQF); 2014 Sep 18. 17 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Ambulatory/Office-based Care

Hospital Inpatient

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Regional, County or City

Statement of Acceptable Minimum Sample Size

Does not apply to this measure

Target Population Age

Age greater than or equal to 18 years

Target Population Gender

Either male or female

National Framework for Public Health Quality

Public Health Aims for Quality

Population-centered

Risk Reducing

Vigilant

National Strategy for Quality Improvement in Health Care

National Quality Strategy Priority

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Not within an IOM Care Need

IOM Domain

Not within an IOM Domain

Data Collection for the Measure

Case Finding Period

The time period is one year.

Note: The reference population rates and signal variance parameters assume a one-year time period.

Denominator Sampling Frame

Geographically defined

Denominator (Index) Event or Characteristic

Geographic Location

Patient/Individual (Consumer) Characteristic

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions
Population ages 18 years and older in metropolitan area (MA) or county. Discharges in the numerator are assigned to the denominator based on the MA or county of the patient residence, not the MA or county of the hospital where the discharge occurred.

Note: The term MA was adopted by the United States (U.S.) Census in 1990 and referred collectively to metropolitan statistical areas (MSAs), consolidated metropolitan statistical areas (CMSAs), and primary metropolitan statistical areas (PMSAs). In addition, "area" could refer to either 1) Federal Information Processing Standard (FIPS) county, 2) modified FIPS county, 3) 1999 Office of Management and Budget (OMB) Metropolitan Statistical Area, or 4) 2003 OMB Metropolitan Statistical Area. Micropolitan Statistical Areas are not used in the Quality Indicator (QI) software.

Exclusions
Unspecified

Numerator Inclusions/Exclusions

Inclusions

Discharges, for patients ages 18 years and older, with a principal International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code for urinary tract infection

Note:

> By definition, discharges with a principal diagnosis of urinary tract infection are precluded from an assignment of Major Diagnostic Categories (MDC) 14 by grouper software. Thus, obstetric discharges should not be considered in the Prevention Quality Indicator (PQI) rate, though the Agency for Healthcare Research and Quality (AHRQ) Quality Indicator (QI™) software does not explicitly exclude obstetric cases.
> Refer to the original measure documentation for ICD-9-CM codes. See also the *Prevention Quality Indicators Appendices*.

Exclusions

Exclude cases:

- Transfer from a hospital (different facility)
- Transfer from a Skilled Nursing Facility (SNF) or Intermediate Care Facility (ICF)
- Transfer from another health care facility
- With any-listed ICD-9-CM diagnosis codes for kidney/urinary tract disorder
- With any-listed ICD-9-CM diagnosis codes or any-listed ICD-9-CM procedure codes for immunocompromised state
- With missing gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing), principal diagnosis (DX1=missing), or county (PSTCO=missing)

Numerator Search Strategy

Institutionalization

Data Source

Administrative clinical data

Type of Health State

Proxy for Health State

Instruments Used and/or Associated with the Measure

Unspecified

Computation of the Measure

Measure Specifies Disaggregation

Does not apply to this measure

Scoring

Rate/Proportion

Interpretation of Score

Does not apply to this measure (i.e., there is no pre-defined preference for the measure score)

Allowance for Patient or Population Factors

not defined yet

Description of Allowance for Patient or Population Factors

The predicted value for each case is computed using a hierarchical model (logistic regression with area random effect) and covariates for gender and age (in 5-year age groups). The reference population used in the regression is the universe of discharges for states that participate in the Healthcare Cost and Utilization Project (HCUP) State Inpatient Data (SID) for the year 2010 (combined), a database consisting of 46 states and approximately 38 million adult discharges, and the United States (U.S.) Census data by county. The expected rate is computed as the sum of the predicted value for each case divided by the number of cases for the unit of analysis of interest (i.e., area). The risk adjusted rate is computed using indirect standardization as the observed rate divided by the expected rate, multiplied by the reference population rate.

Refer to the original measure documentation for the specific covariates for this measure.

Standard of Comparison

not defined yet

Identifying Information

Original Title

PQI 12: urinary tract infection admission rate.

Measure Collection Name

Agency for Healthcare Research and Quality (AHRQ) Quality Indicators

Measure Set Name

Prevention Quality Indicators

Submitter

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Developer

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Funding Source(s)

Agency for Healthcare Research and Quality (AHRQ)

Composition of the Group that Developed the Measure

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicator (QI) measures are developed by a team of clinical and measurement experts in collaboration with AHRQ. The AHRQ QIs are continually updated as a result of new research evidence and validation efforts, user feedback, guidance from the National Quality Forum (NQF), and general advances in the science of quality measurement.

Financial Disclosures/Other Potential Conflicts of Interest

None

Endorser

National Quality Forum - None

NQF Number

not defined yet

Date of Endorsement

2014 Sep 18

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2015 Mar

Measure Maintenance

Measure is reviewed and updated on a yearly basis

Date of Next Anticipated Revision

Spring 2016 (version 6.0, including International Classification of Diseases, Tenth Revision, Clinical Modification [ICD-10-CM] and International Classification of Diseases, Tenth Revision, Procedure Coding System [ICD-10-PCS] compatible software)

Measure Status

This is the current release of the measure.

This measure updates previous versions:

AHRQ QI. Prevention quality indicators #12: technical specifications. Urinary tract infection admission rate [version 4.4]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2012 Mar. 2 p.
AHRQ quality indicators. Prevention quality indicators: technical specifications [version 4.4]. Appendices. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2012 Mar. 6 p.

Measure Availability

Source available from the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators (QI) Web site.

For more information, contact the AHRQ QI Support Team at E-mail: QIsupport@ahrq.hhs.gov; Phone: 301-427-1949.

Companion Documents

The following are available:

AHRQ quality indicators. Prevention quality indicators (PQI) parameter estimates [version 5.0]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 21 p. This document is available from the AHRQ Quality Indicators Web site.
AHRQ quality indicators. Prevention quality indicators benchmark data tables [version 5.0]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 9 p. This document is available from the AHRQ Quality Indicators Web site.
AHRQ quality indicators. Prevention quality indicators (PQI) composite measure workgroup. Final report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Apr 7. various p. This document is available from the AHRQ Quality Indicators Web site.
HCUPnet: a tool for identifying, tracking, and analyzing national hospital statistics. [Web site]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); [accessed 2015 Sep 10]. HCUPnet is available from the AHRQ Web site.

NQMC Status

This NQMC summary was completed by ECRI on December 19, 2002. The information was verified by the Agency for Healthcare Research and Quality on January 9, 2003.

This NQMC summary was updated by ECRI Institute on April 6, 2004, February 18, 2005, February 27, 2006, June 15, 2007, November 26, 2008 and May 22, 2010.

This NQMC summary was reviewed and edited by ECRI Institute on May 16, 2011.

This NQMC summary was retrofitted into the new template on July 13, 2011.

This NQMC summary was updated by ECRI Institute on February 22, 2013 and again on December 1, 2015. The information was verified by the measure developer on January 19, 2016.

Copyright Statement

Production

Source(s)

Source(s)

AHRQ QI research version 5.0. Prevention quality indicator 12 technical specifications: urinary tract infection admission rate. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 2 p.

National Quality Forum measure information: urinary tract infection admission rate (PQI 12). Washington (DC): National Quality Forum (NQF); 2014 Sep 18. 17 p.

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